Wind Effects and Spray Enhancement Test Plans

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ABSTRACT

Field tests are planned this summer both for investigating the effects of wind on ACC performance and for observing the use of spray inlet cooling on ACC operation. This presentation will briefly describe the instrumentation and test plans and solicit audience discussion on how to improve the measurements and the test plans.

Wind study

Wind effects will studied at five plants; four combined-cycle plants (Bighorn, El Dorado, Apex and Front Range) and one coal plant (Neil Simpson II). The two major effects of wind are assumed to be hot air recirculation and degradation of fan performance. Continuous measurements of ambient temperature, wind speed, wind direction and steam turbine exhaust pressure will be taken. Inlet air temperature will be measured in all cells. Fan performance will be monitored at four or five cells, including static pressure, inlet velocity and motor power. These comprehensive measurements will be made at the first site in the hope of determining a simpler, surrogate measurement that can be used at the four remaining sites. Test will be run at each site for one to two weeks to observe a range of wind conditions.

Spray enhancement

Ambient temperature, wind speed and wind direction will be monitored continuously. A single interior cell will be chosen for primary observation. Air temperatures will be monitored at nine locations near the inlet plane of the finned tube bundles on both faces of the cell. A lesser number of measurements will be made in adjacent cells. Sensitive paper droplet detection will be deployed across one face to determine the amount of unevaporated liquid reaching the tube bundles.

Spray nozzles will be mounted at numerous locations with adjustable orientation around the ACC perimeter and around and under the monitored cell. Spray rate, nozzle location, nozzle orientation and drop size (different nozzles and supply pressure) will be varied. Tests will be conducted over a two month period at one site (Bighorn) to observe operation at different ambient conditions

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